

Early Literacy and Brain Development

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Ram Sam Sam

A ram sam sam

A ram sam sam

Goolie, goolie, goolie, goolie

Ram sam sam

A-raffey! A-raffey!

Goolie, goolie, goolie, goolie

Ram sam sam

Research to Practice: Singing

■ Research Finding:

- Singing enhances learning.
 - Increases alertness (oxygen)
 - Enhances memories (endorphins)
 - Energizes thinking (cross-lateral movements)
 - Provides a transition
 - Encourages pattern processing.
 - Provides support for literacy skills.

■ Practice:

- Sing several times a day. Make it a routine.
- Use singing as a springboard to literacy skills.
- Be intentional!

Success in Reading is Influenced by Spoken Language Competencies

- Size of the child's vocabulary
- Number of grammatical errors
- Sophistication of sentences structure
- Comprehension of variations of sentence structure
 - The man chased the cat
 - The cat chased the man.

The development of language and the development of literacy are connected. They follow similar pathways.

Acquisition of Language

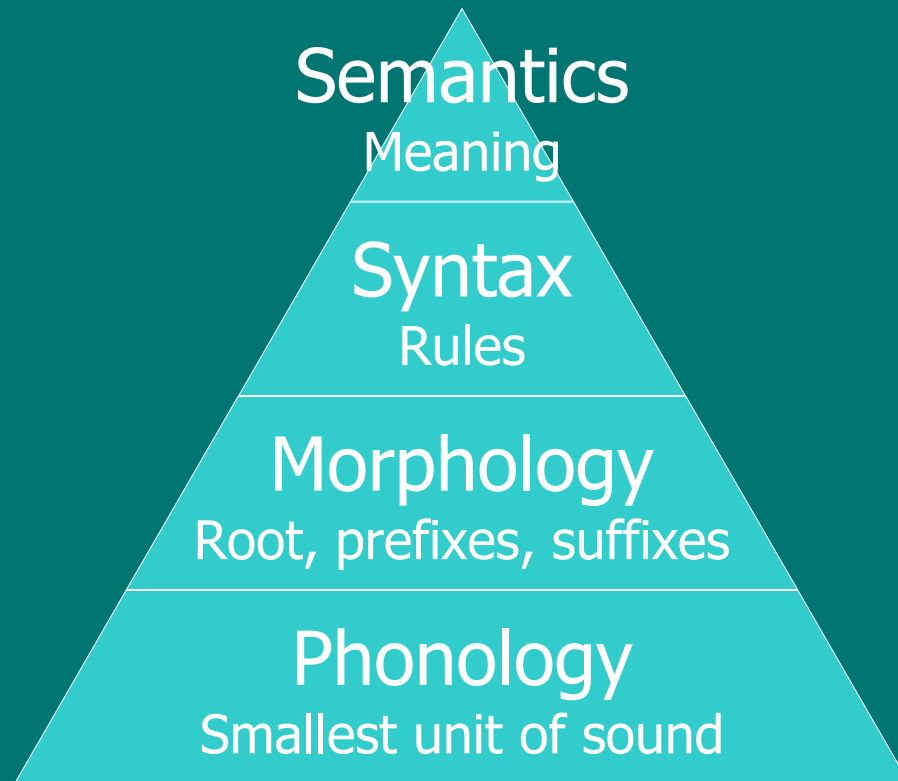
Age	Activity
Birth	Responds to prosody (rhythm, cadence, pitch)
6 months	Recognizes phonemes (genes and environment)
8 months	Recognize word boundaries (intonations)
12 months	Attaches meaning to words Rate: 7 to 10 words per day
18 months	Recognizes noun/verbs differences Nouns/verbs create mental images (concrete images)
24 months	Recognizes other grammatical functions
30-36 months	Most language activity moves to left hemisphere

Windows of Opportunity

Window	Wiring Opportunity	Enhancement
Emotional Intelligence Trust Impulse Control	0- 48 months 0- 14 months 16-48 months	4 years to seven
Social Development Attachment Independence Cooperation	0-48 months 0-12 months 18-36 months 24-48 months	4 years to puberty
Thinking Skills Cause and Effect Problem-Solving	0-48 months 0-16 months 16-48 months	4 years to puberty
Motor Development	0-24 months	2-5 years
Vision	0-24 months	4 years to puberty
Reading Skills Early Sounds Vocabulary	0-24 months 4- 8 months 0-16 months	2-7 years 8 months-10 years 2-5 years

Most researchers agree that acquiring language within the language specific areas of the brain diminishes for most people around 10-12 years of age.

Hierarchy of Language Development



Beginning English language learners need to understand how English rules of syntax differ from those of their native tongue.

This must be intentionally taught!

From Speaking to Reading

Reading is easy—right?

Read the statement below.

¿ 4 ± < * * * ± 0
 <] # √ U @ @ # ∫
 ∫ √ ~ # √ # ∫ * ~ ~

Alphabet

A= √	F= €	K= \$	P= @	U= ≡	Z= >
B= √ √	G= ¥	L= ~ ~	Q= ¥ ¥	V= 0	
C= U	H= ±	M= 4	R=]	W= ε	
D= ~	I = ≠	N= <	S= Δ	X= ∩	
E= *	J = ≤	O= ∫	T= Γ	Y= ¿	

Brain Basics

- Learning to speak is an innate ability. Reading is not.
- Individual differences in efficiency in reading is comparable to individual differences in music, athletics or building a model. A complex interplay between **genes and environment** and the unfolding of developmental timetables.

Sousa, David (2005) *How the Brain Learns to Read*. Thousand Oaks, CA; Corwin Press.

A Complex Interplay



Mozart (1756-1791)

- Genes
- Environment
- “Windows of Opportunity

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Brain Basics Related to Sound

- The awareness of sound differences (phonemes) in spoken language is crucial to learning to read written language. (wiring window: 4-8 months)
- Simply learning letter-sound relationships during phonics instruction does not necessarily lead to phonemic awareness.

Sousa, David (2005) *How the Brain Learns to Read*. Thousand Oaks, CA; Corwin Press.

Definition of Terms

Term	Definition	Example
Phonological Awareness	The awareness of any size unit of sound (syllables, phonemes, rhyming words) <i>Hickey, Picky, Bumblebee</i>	The word "kitten" is made up of 2 syllables, each composed of 3 phonemes.
Phonemic Awareness	The awareness that spoken language is made up of individual units of sound.	The word "cat" has three phonemes. /c/a/t/
Phonics	An instructional approach that teaches reading through sound-symbol relationships.	The symbol <i>d</i> is used to represent the italicized sound in the words <i>dog</i> and <i>doll</i> .

Phonological Awareness Continuum

**Phonemic
Awareness**

Onset/Rime

Syllabication
words - syllables

Alliteration

Rhyming
alike and different

Listening

Learning to read is built on the neural pathway that wired for speaking.

Children who are proficient communicators are generally successful readers.

Research Finding: Past learning always influences new learning.

Literacy and Language Continuums

Stages of Literacy Development	Stages of Language Development
Getting Ready Listening Falling in Love with Sounds	Responds to prosody Phoneme recognition
Developing Oral Language Extending and Enriching Vocabulary Matching Words to Thoughts and Actions	Attaches meaning to words Recognizes word boundaries Recognizes and uses nouns and verbs <i>Phonemic awareness is a stronger predictor of reading success than intelligence.</i>
Comprehending Enacting, Dramatizing, Recreating Stories Answering Multi-level Questions Mastering syntax	Recognizing other grammatical functions <i>Spoken comprehension correlates to written comprehension.</i>
Understanding Functions of Print Environmental Print Spatial Orientation Part/Whole Relationships Putting Thoughts on Paper	Most language activity moves to left hemisphere
Acquiring Reading Skills Reading Predictable Text Developing Sight Words Phonemic Awareness	Most language activity moves to left hemisphere

Developing Literacy in the Early Childhood Classroom with Brain Compatible Strategies

Brain Compatible Strategies

- Be intentional.
- Follow a continuum.
- Use a lesson cycle that enhances processing.
- Keep activities hands-on.
- Engage both hemispheres.
- Use developmentally appropriate activities as a springboard. Cloak rigor in joy!
- Nurture disposition. Make it joyful!

Research to Practice: Intentional Instruction

■ Research Finding:

- Intentional instruction optimizes learning.

■ Practices:

- Act with specific outcomes or goals in mind.
 - Academic (literacy, mathematics, science)
 - Domains (cognitive, social-emotional, motor...)
- Possess a wide-range of knowledge.
(content, instructional strategies, research)
- Balance instruction between teacher guided and student guided experiences.
- Utilize continuums.

Research to Practice: Literacy Continuum

■ Research Finding:

- Past learning always influences new learning.

■ Practices:

- Know and use continuums.
 - Listening
 - Falling in love with language
 - Developing vocabulary
 - Mastering syntax
 - Comprehension
 - Print Awareness
 - Decoding

Research to Practice: Lesson Cycle

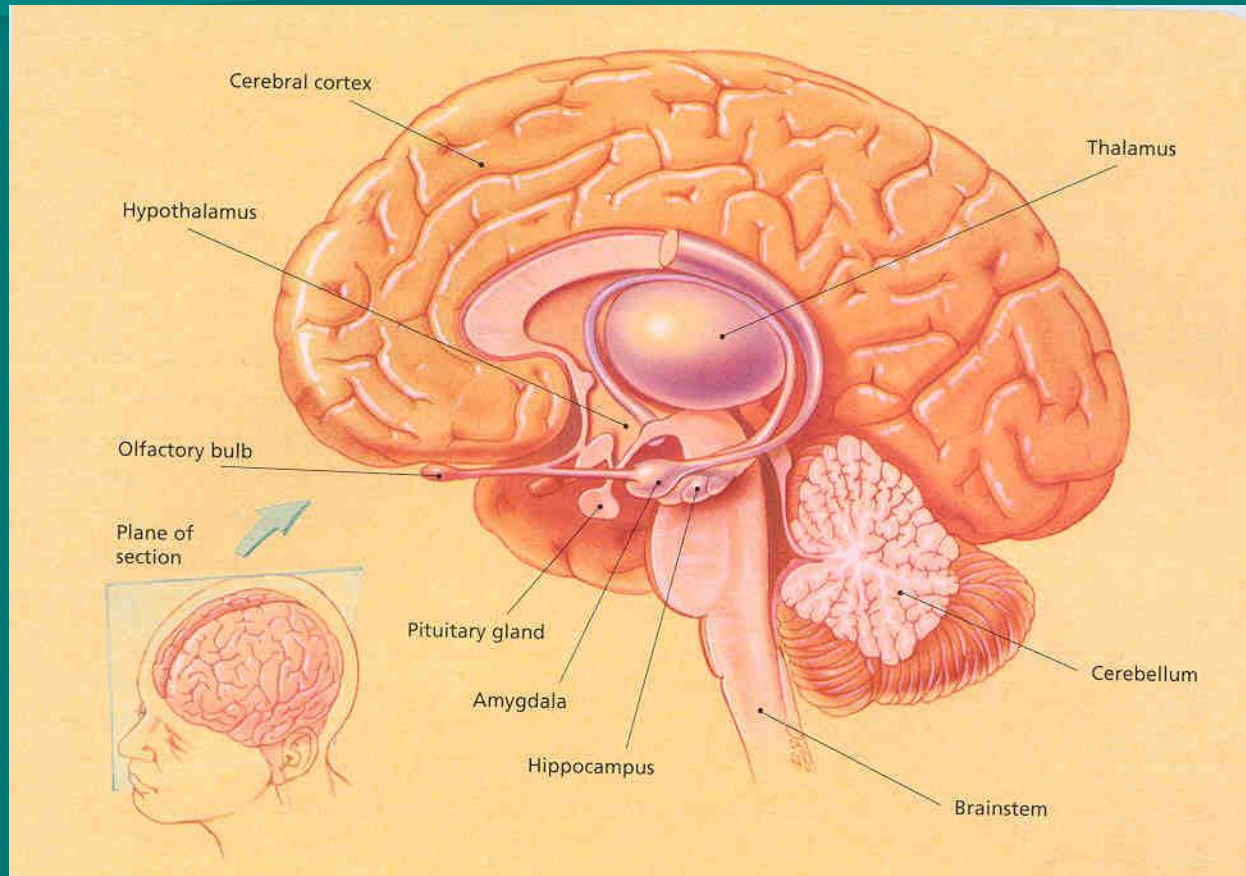
■ Research Finding:

- There is a predictable process for assisting the brain in channeling stimuli into long term learning.

■ Practices:

- Make sure the environment is safe.
- Make sure the environment is uncluttered.
- Focus learners.
- Engage multiple senses.
- Follow the interest of the learner.
- Help learners make sense of new information.
- Help learners establish meaning for new information.
- Use emotions to stimulate interest.
- Provide hands-on practice.
- Provide time for reflection.
- Learning space is uncluttered.

Research to Practice: Lesson Cycle



Research to Practice: Lesson Cycle

■ Focus

- Questions
- Interesting statements
- Photos

■ Develop

- Tap into prior knowledge
- Point out likenesses and differences
- Identify patterns
- Demonstrate or discuss relevance of the material

■ Practice

- Hands-on
- Follows the lesson as closely as possible

■ Reflect

- How will I use this information?
- How has my thinking changed?

Research to Practice: Letter Knowledge

■ Research Findings:

- The brain learns when it encounters **differences**.
- The brain learns best when it is allowed to make **comparisons**.
- Analyzing (comparing and contrasting) promotes information processing. The results are stored in areas of the brain that promote quick access and conceptual connections.
- Rote memory results in information being stored in lower functioning areas of the brain.

Practices:

- Introduce three to four letters at one time.
- Use strategies that demonstrate that the alphabet is flexible (no fixed).

Research to Practice: Hands-on Activities

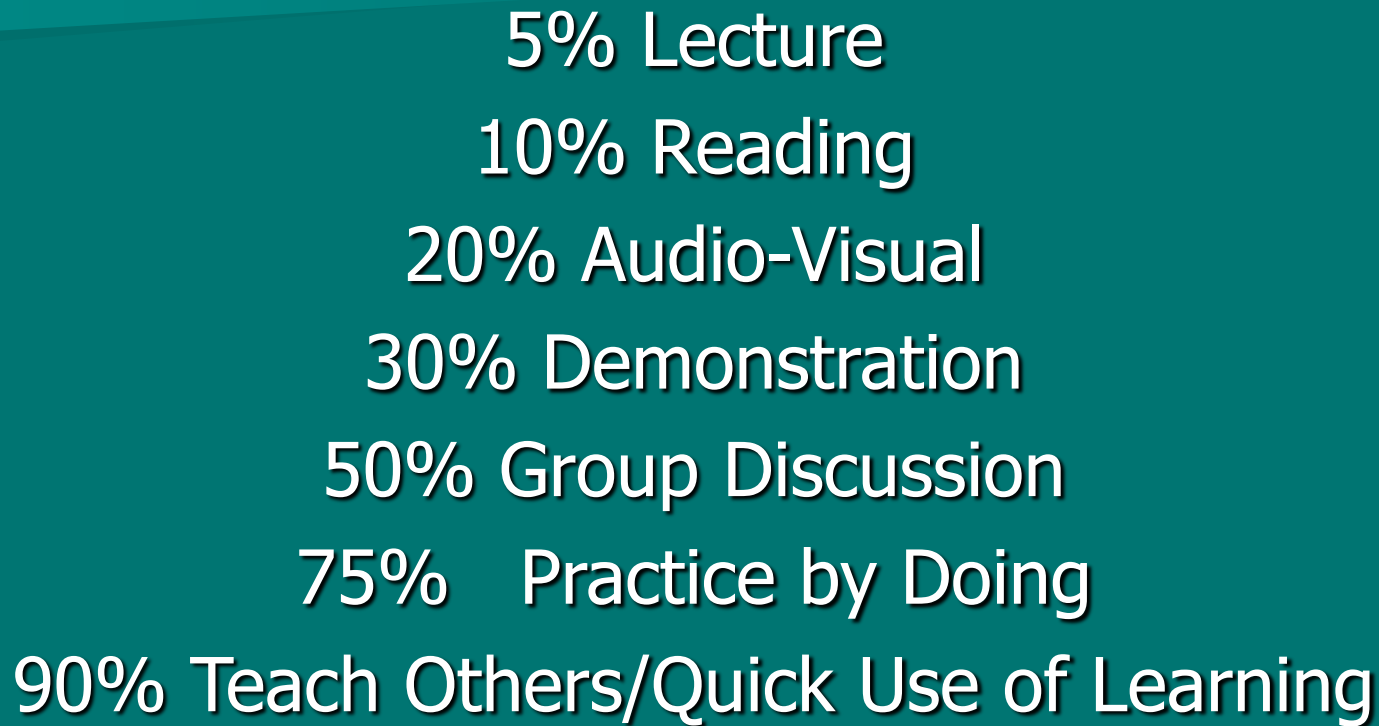
■ Research Findings:

- Hands-on interactions increase the chance that the new information will be stored in long term memory by 75%.
 - Increases sensory input (focus)
 - Allows for experimentation (sense and meaning)
- The gestalt hemisphere completes development between the ages of 4-7.
- Concrete materials reduce misinterpretation.

■ Practices:

- Provide concrete experiences.
- Use play as a format for practicing literacy skills.
- Eliminate direct instruction and memorization.

Average Retention Rate after 24 Hours



5%	Lecture
10%	Reading
20%	Audio-Visual
30%	Demonstration
50%	Group Discussion
75%	Practice by Doing
90%	Teach Others/Quick Use of Learning

Sousa, David A., *How the Brain Learns*. Virginia: NASSP, 2005

Research to Practice: Hemispheres

■ Research Findings:

- The right hemisphere and the left hemisphere have distinctly different functions that are not readily interchangeable.
- Most people have a hemisphere dominance which affects their personality, abilities and learning style.
- More girls than boys are left hemisphere dominant. More boys than girls are right hemisphere dominant.

■ Practices:

- Teach to both hemispheres.

Research to Practice: Hemispheres

Logic Hemisphere (Left)	Gestalt Hemisphere (rt)
Logical and analytical thinking Inductive	Intuitive and holistic thinking Deductive
Deals with inputs one at a time	Deals with many inputs at a time
Processes information linearly and sequentially	Processes information diffusely and simultaneously (globally)
Deals with time	Deals with space
Responsible for verbal expression and language	Responsible for gestures, facial expressions and body language
Responsible for invariable and arithmetic operations	Responsible for relational mathematical operations
The seat of reason	The seat of passions/ dreams
Recognizes words and numbers	Recognizes places, faces, music
Crucial for wordsmiths and engineers	Crucial for artist and musicians
Connected to right side of the body	Connected to left side of the body

Teaching to Both Hemispheres

- Deal with concepts visually and verbally.
 - Stop periodically when reading to discuss events or illustrations in the story.
 - Use concrete examples.
 - Use story maps.
- Discuss concepts logically and intuitively.
 - Use imagery with all discussion.
 - Ask feeling questions.
 - Ask "what if" questions.
- Avoid conflicting messages. Make sure your tone, facial expressions, and body language match your words.
- Design activities and assessments that allow students of different hemispheric dominance to express themselves in different ways.
 - Children can draw a picture of their favorite part of the story.
 - Children can re-enact the story.

Research to Practice: DAP Activities

■ Research Findings:

- Development and learning result from a dynamic and continuous interaction of biological maturation and experience.
- Optimal periods exist for certain types of development and learning to occur.
- Play is an important vehicle for developing self-regulation, and for promoting language, cognition, and social competence.

■ Practices:

- Individualize instruction.
- Follow scientific “developmental timetables.”
- Provide intentional activities that allow appropriate outcomes to evolve during play activities.

Research to Practice: Song as a Springboard

Literacy Skill	Songs
Oral Language	Itsy Bitsy Spider
Phonological Awareness Falling in Love Playing with Language	Down by the Bay Miss Mary Mack Catalina Magnalina
Letter Knowledge	Bingo The Alphabet Song S-M-I-L-E
Print Awareness	Any short song Any song title

Research to Practice: Nurture Disposition

■ Research Finding:

- Development and learning advance when children are challenged to achieve at a level just beyond their current mastery, and also when they have many opportunities to practice newly acquired skills joyfully.

■ Practices:

- Read stories just for enjoyment.
 - Follow the interest of the child.
 - Pick books with appropriate lengths.
 - Don't over moralize or over teach.
 - Read from a variety of sources.
 - Make sure illustrations are appealing and accurate.
- Show your own love of books.
- Use activities and experience that are appropriate.
 - Hands-on (drawing, flannel board stories, puppets)
 - Singing and moving
 - Re-enacting, dramatizing and retelling

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